

# The definition of zero carbon

## In summary

In order to define zero carbon and devise a method for measuring carbon content, it is essential to create a common understanding of the meaning of sustainable buildings.

The Chartered Institute of Building (CIOB) believes that a new definition of zero carbon should be agreed by government and industry as soon as possible, and applied consistently across domestic and non-domestic buildings.

The CIOB supports a definition that recognises the contribution of off-site energy solutions to the net carbon dioxide emissions of a development.

The CIOB believes that more work needs to be done to look at the contribution of embodied energy to the overall carbon footprint of buildings.

## The issues

### Policy context

Climate change is one of the most serious challenges facing the world in the 21st century. With 50% of emissions being apportioned directly to the buildings we live and work in, the built environment is in the front line of the battle to cut carbon dioxide emissions.

The challenge of reducing emissions is not just limited to new building stock but to existing buildings as well. The majority of the 2025 building stock has already been built, and improving the performance of the existing building stock is the most important and potentially effective area where carbon emissions can be significantly reduced.

Rightly or wrongly, the focus so far, has been on delivering zero carbon new buildings. The UK Government has set a goal for all new homes to be zero carbon by 2016. Ministers have also set out an ambition to require all new schools to be zero carbon by 2016; all public sector buildings by 2018; and potentially all new buildings by 2019.

To achieve these targets a clear and pragmatic definition of zero carbon must be agreed by industry and government, and consistently applied across different building types. The definition, which is outlined in industry standards and codes of best practice, must allow sufficient levels of flexibility to be achievable in the vast majority of situations, without reducing the level of ambition in terms of carbon emission reductions overall. It must also be applicable across domestic and non-domestic buildings to facilitate the delivery of mixed-use developments.

## The definition of zero carbon

A building is considered to be 'zero carbon' when the net carbon dioxide emissions resulting from all energy used in the building is zero.

Zero carbon is defined in a number of different ways in industry standards and best practice guides, however the most recent definition is published within the Code for Sustainable Homes (CSH) Technical Guidance (April 2008). The calculation for a zero carbon home, according to this definition, includes all the energy consumed in the building, the contribution of energy from on-site renewable/low carbon installations, and off-site renewable contributions that are directly supplied to the dwellings by private wire arrangements.

That said the recent European Court of Justice (ECJ) decision concerning private wire systems does not help. This decision concluded that such systems may be contrary to established EC Directives in terms of competition. Given the intrinsic importance of this recent ECJ decision, the UK Government needs to address this issue as a matter of urgency and provide the construction and utility service industries with appropriate definitive guidance.

The exclusion of all other off-site renewable energy sources from the calculation has been the subject of much debate. Recent research has shown that the current definition of a zero carbon home is unrealistic and unachievable on up to 80% of new homes.

Therefore, if Government wants to maintain its housing delivery targets of three million new homes by 2020, without watering down the level of carbon savings, the definition of zero carbon must change.

The CIOB believes the definition of zero carbon should be changed as soon as possible to recognise the contribution of off-site energy solutions. The definition for domestic and non-domestic buildings must also be aligned so that mixed-use schemes can continue to be delivered effectively.

## Life-cycle zero carbon

Existing definitions of zero carbon do not account for the energy used in creating, renovating, maintaining and disposing of a building, yet research has shown that this can be significantly more than the energy used in operating a building.

A life-cycle zero carbon calculation would include the energy used in the renovation and maintenance of a building, on-site energy use, embodied energy in the materials used, and the disposal of waste.

This additional embodied energy is a significant component of the life-cycle impact of buildings. Every building is a complex combination of many processed materials, each of which contributes to the building's total emissions.

The single most important factor in reducing the impact of embodied energy is to design long life, durable and adaptable buildings. The phrase 'Long life, loose fit, low energy' is appropriate, where loose fit means that a building is suitable for adaptation to many new uses over its life-cycle.

The CIOB believes that more work needs to be done to investigate the contribution of embodied energy to the overall carbon footprint of buildings.

### The CIOB recommends and supports:

- A new definition of zero carbon that can be applied consistently across domestic and non-domestic buildings.
- A definition that recognises the contribution of off-site energy solutions to the net carbon dioxide emissions of a development.
- Off-site energy solutions that are specifically built to deliver the energy needs of the development.
- The role of the independent 'Zero Carbon Hub' (established in June 2008) for implementing the Government's zero carbon building targets in collaboration with industry.
- A more detailed review of the embodied energy contributing to the net carbon emission of buildings.
- That the Government provide definitive guidance to the construction and utility service industries on private wire arrangements.



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